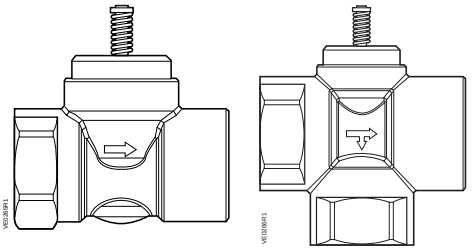
Dodge Engineering & Controls, Inc.

Technical Instructions

November 6, 2003

Basic Hot Water / Chilled Water Zone Control Valves (Valve Bodies)

GZ2C/GZ3C NPT Series and GZ2D/GZ3D Sweat Series Two-Way and Three-Way



Description	The GZ2C/GZ3C NPT Series two and three-way and GZ2D/GZ3D Sweat Series two and three-way Zone Valves with a 1/10-inch (2.5 mm) stroke.		
Features	Direct-coupled, universal bonnet		
Application	Control of hot or chilled water for: • Zones with radiators • Floor heating by manifolds • Fan coil units • Induction units		• Cooling ceilings (zone valves) • Wall-mounted boilers (zone valves) • VAV applications
Specifications	Line size		1/2 to 1-inch (15 to 25 mm)
	Body style		Globe
	Seat style		Metal-to-metal
	Action	Two-way:	NO/NC determined by actuator
		Three-way:	Diverting
			Mixing (limited application)
	Valve body rating		ANSI Class 125
	Stem travel (Stroke)		1/10-inch (2.5 mm)
Material	Body		Brass
	Body trim		Brass
	Stem		Stainless steel ASTM A582 Type 303
	Packing		Ethylene propylene O-ring
Operating	Controlled medium		Water, glycol solutions to 50%
	Medium temperature range		34°F to 230°F (1°C to 110°C)
	Maximum inlet pressure		125 psig
	Close off pressure		

Valve Size Inch (mm)	Pressure Psi (kPa)
1/2 (15)	44 (303)
3/4 (20)	44 (303)
1 (25)	22 (152)

Operation

2-Way

Figure 1 shows the zone valve in the open or full flow position. The valve spring provides the necessary force to hold the stem in the raised or NO position.

In the event of power failure, the actuator returns to its normal position; the actuator determines whether the valve will fail open or closed. Refer to the actuator *Technical Instructions* for additional information.

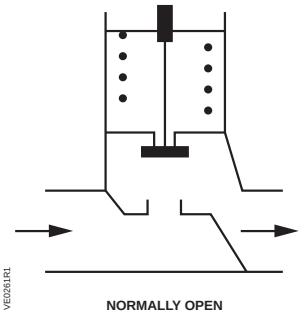


Figure 1.

3-Way

Diverting

As the valve stem moves downward, the flow through the NO port (AB-A) decreases and the flow through the NC port (AB-B) increases. As the valve stem moves upward, the flow through the NO port (AB-A) increases and the flow through the NC (AB-B) port decreases.

In the event of power failure, the actuator returns the valve to its normal position; the actuator determines whether the valve fails with flow to port A or port B. See the actuator Technical Instructions *Technical Instructions* for additional information.

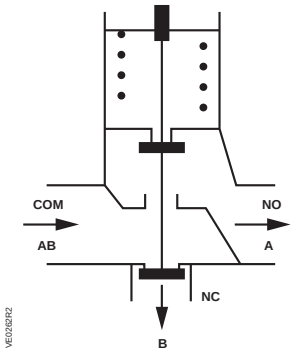


Figure 2.

Mixing

The 3-way zone valves are diverting valves. However, they may be used as mixing valves under the conditions shown in Figures 3 and 4.

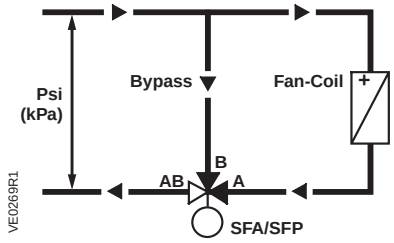


Figure 3. Mounting in the Return Flow.

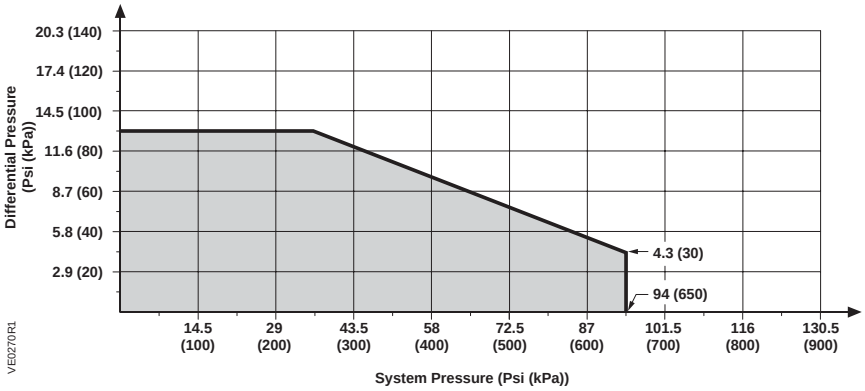


Figure 4. Allowable Differential Pressure in Relation to the System Pressure.

Sizing

The sizing of a valve is important for correct system operation. An undersized valve will not have sufficient capacity at maximum load. An oversized valve can initiate cycling and can damage the seat and throttling plug because of the restricted opening. Correct sizing of the control valve for actual expected conditions is considered essential for good control.

The following variables must be determined:

- The medium to be controlled: hot or chilled water.
- The maximum inlet temperature and pressure of the medium at the valve.
- The pressure differential that will exist across the valve under maximum load demand.
- The maximum capacity the valve must deliver.
- The maximum line pressure differential the valve actuator must close against.

Mounting and Installation

- Install the valve so that the flow follows the direction of the arrow indicated on the valve body. See Pages 2 and 3 for mixing vs. diverting applications.
- For best performance, install the valve assembly with the actuator above the valve body. The valve and actuator can be installed in any position between vertical and horizontal.

  NOTE: It is not recommended to install the valve assembly so that the actuator is below horizontal or upside down.
- Allow sufficient space for servicing the valve and actuator. See Table 4 for valve body dimensions.

  NOTE: Instructions for field mounting an actuator, wiring diagrams, and start-up are covered in the Technical Instructions for each actuator.

Service

Replace the valve if inoperable.

Table 1. Zone Valve Close-Off Pressures.

Valve Size Inch (mm)	Pressure psi (kPa)
1/2 (15)	44 (303)
3/4 (20)	44 (303)
1 (25)	22 (152)

Note: Close-off pressures are the same for all ENZ4, ESZ4 and ESZ5 actuators.

Table 2. Product Numbers: 2-Way Zone Valve/Electronic Actuator Assemblies

Connection	Line Size		Flow Rate			120 Vac		24 Vac			
						2-Position		2-Position		3-Position	0 to 10 Vdc Modulating
						Actuator Codes					
	Inch	Mm	Cv	Kvs	Valve Body	Normally Closed	Normally Open	Normally Closed	Normally Open	Fail-in-Place	Fail-in-Place
NPT	0.50	15	2.5	2.15	GZ2C-2.5	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	0.75	20	4.1	3.5	GZ2C-4.1	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	1.00	25	7.0	6.0	GZ2C-7.0	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
Sweat	0.50	15	2.5	2.15	GZ2D-2.5	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	0.75	20	4.1	3.5	GZ2D-4.1	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	1.00	25	7.0	6.0	GZ2D-7.0	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2

NOTE: For more information, see Technical Instructions.

Table 3. Product Numbers: 3-Way Diverting Zone Valves /Electronic Valve Assemblies.

Connection	Line Size					120 Vac		24 Vac			
						2-Position		2-Position		3-Position	0 to 10 Vdc Modulating
						Actuator Codes					
	Inch	Mm	Cv	Kvs	Valve Body	Fail AB→B	Fail AB→A	Fail AB→B	Fail AB→A	Fail-in-Place	Fail-in-Place
NPT	0.50	15	2.5	2.15	GZ3C-2.5	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	0.75	20	4.1	3.5	GZ3C-4.1	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	1.00	25	7.0	6.0	GZ3C-7.0	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
Sweat	0.50	15	2.5	2.15	GZ3D-2.5	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	0.75	20	4.1	3.5	GZ3D-4.1	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2
	1.00	25	7.0	6.0	GZ3D-7.0	ESZ5A1	ESZ4A1	ESZ5A2	ESZ4A2	ENZ4C2	ENZ4B2

NOTE: For more information, see Technical Instructions.

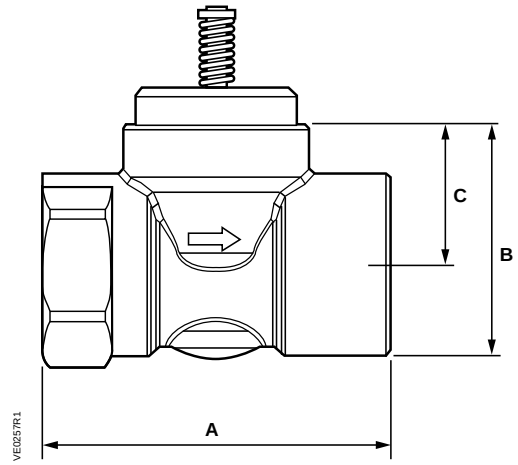


Figure 5. 2-Way Zone Valve, Normally Open.

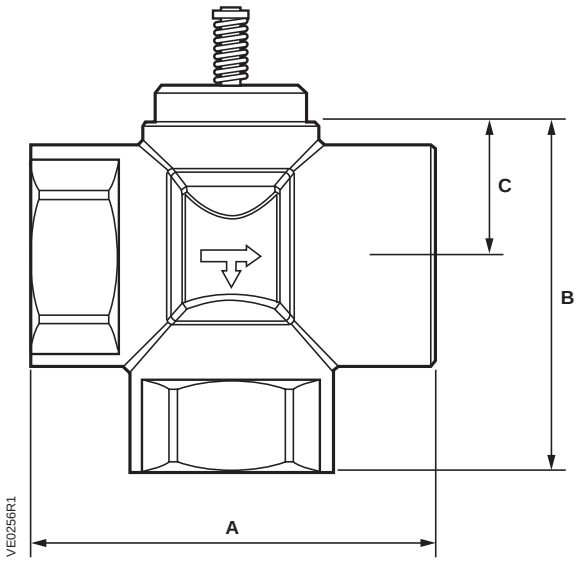


Figure 6. 3-Way Diverting* Zone Valve.

***For mixing applications, see Page 3.**

Table 4. Valve Dimensions.

Connection Type	Valve Size Inch (mm)	2-Way Valve				3-Way Valve			
		A	B	C	Weight lb (kg)	A	B	C	Weight lb (kg)
NPT	0.5 (15)	2.76 (70)	1.63 (41.5)	1.00 (25.4)	0.82 (0.37)	2.76 (70)	2.34 (59.5)	1.00 (25.4)	1.08 (0.49)
	0.75 (20)	2.76 (70)	1.77 (45)	1.00 (25.4)	.99 (0.45)	2.76 (70)	2.34 (59.5)	1.00 (25.4)	1.26 (0.57)
	1.0 (25)	3.50 (89)	2.10 (54)	1.00 (25.4)	1.68 (0.76)	3.50 (89)	2.85 (67.3)	1.00 (25.4)	2.14 (0.97)
Sweat	0.5) (15)	2.66 (66)	1.48 (38)	1.00 (25.4)	0.60 (0.27)	2.66 (68)	2.26 (57.5)	1.00 (25.4)	0.71 (0.32)
	0.75 (20)	2.76 (70)	1.63 (41.5)	1.00 (25.4)	0.71 (0.32)	2.76 (0.70)	2.34 (59.5)	1.00 (25.4)	0.86 (0.39)
	1.00 (25)	3.50 (89)	1.77 (45)	1.00 (25.4)	1.06 (0.48)	3.50 (89)	2.65 (67)	1.00 (25.4)	1.24 (0.56)

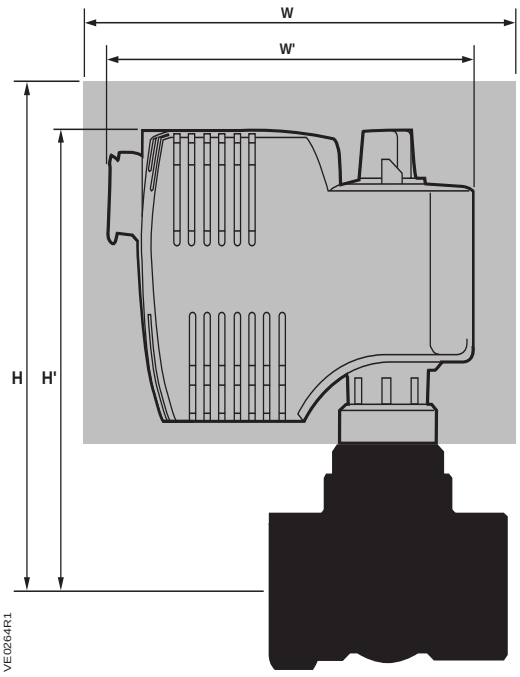


Figure 7. ESZ4/ESZ5 Series Actuator: Service Envelope for 2-Way Valve Assembly.

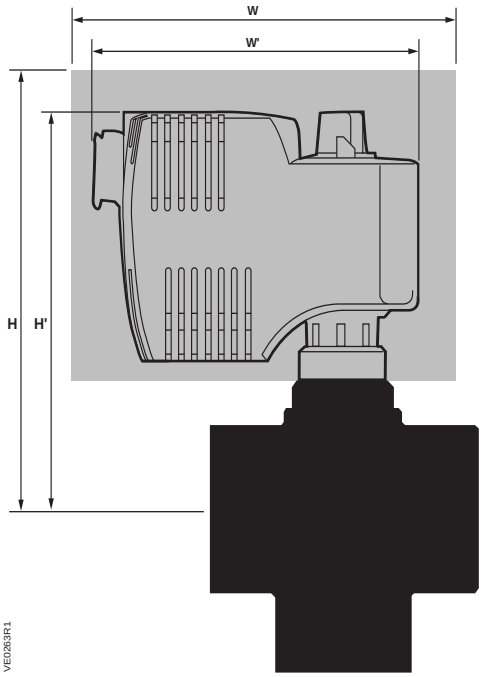


Figure 8. ESZ4/ESZ5 Series Actuator: Service Envelope for 3-Way Valve Assembly.

Table 5. ESZ4/ESZ5 Actuator Dimensions and Recommended Service Envelope in Inches (Millimeters).

Actuator	Actuator Prefix Codes	Valve Line Size	Valve Centerline to Top of Actuator H1		Service Height H		Width or Diameter of Actuator W1		Service Width W	
			2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
Fail-Up/ Fail-Down	ESZ5A1 ESZ4A1 ESZ5A2 ESZ4A2	0.5 (15)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)
		0.75 (20)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)
		1.00 (25)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)	4.38 (112)	4.38 (112)	12.38 (315)	12.38 (315)

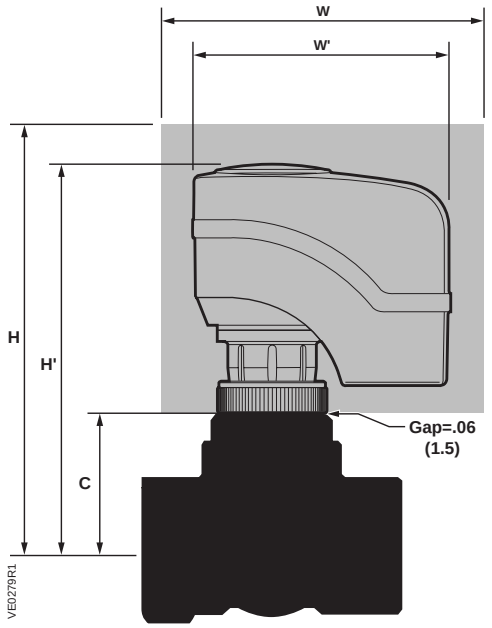


Figure 9. ENZ4 Series Actuator: Service Envelope for 2-Way Valve Assembly.

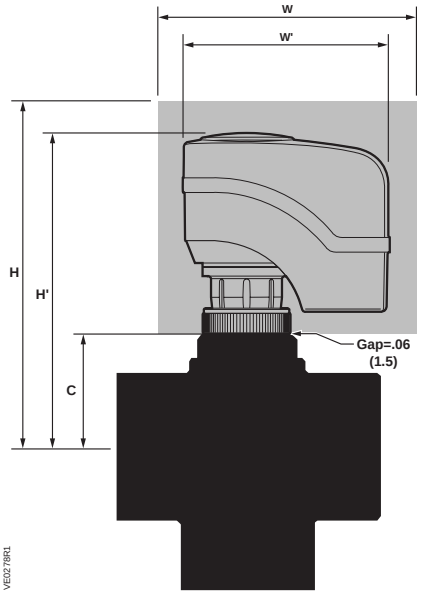


Figure 10. ENZ4 Series Actuator: Service Envelope for 3-Way Valve Assembly.

Table 6. ENZ4 Actuator Dimensions and Recommended Service Envelope in Inches (Millimeters).

Actuator Prefix Codes	Valve Line Size	Valve Centerline to Top of Actuator H1		Service Height H		Valve Centerline to Actuator Coupling C		Width or Diameter of Actuator W1		Service Width W	
		2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
ENZ4C2 ENZ4B2	0.5 (15)	4.26 (108.2)	4.26 108.2)	12.26 (311.4)	12.26 (311.4)	1.00 (25.4)	1.00 (25.4)	3.26 (82.8)	3.26 (82.8)	11.26 (286.0)	11.26 (286.0)
	0.75 (20)	4.26 (108.2)	4.26 (108.2)	12.26 (311.4)	12.26 (311.4)	1.00 (25.4)	1.00 (25.4)	3.26 (82.8)	3.26 (82.8)	11.26 (286.0)	11.26 (286.0)
	1.00 (25)	4.26 (108.2)	4.26 (108.2)	12.26 (311.4)	12.26 (311.4)	1.00 (25.4)	1.00 (25.4)	3.26 (82.8)	3.26 (82.8)	11.26 (286.0)	11.26 (286.0)

Thermic Actuator

Table 7. Thermic Actuator Product Numbers.

Product Number	Voltage	Cable Length Feet (Meters)
ESZ7F2	24 Vac/Vdc	3.9 (1.2)

Table 8. ESZ7F2 Thermic Actuator/Valve Assembly Part Numbers.

	Line Size		Flow Rate		2-Way Normally Closed	3-Way Fail AB→B
	inch	mm	Cv	Kvs	Assembly	Assembly
NPT	0.50	15	2.5	2.0	ESZ7F2 / GZ2C-2.5	ESZ7F2 / GZ3C-2.5
	0.75	20	4.1	3.5	ESZ7F2 / GZ2C-4.1	ESZ7F2 / GZ3C-4.1
	1.00	25	7.0	6.0	ESZ7F2 / GZ2C-7.0	ESZ7F2 / GZ3C-7.0
Sweat	0.50	15	2.5	2.0	ESZ7F2 / GZ2D-2.5	ESZ7F2 / GZ3D-2.5
	0.75	20	4.1	3.5	ESZ7F2 / GZ2D-4.1	ESZ7F2 / GZ3D-4.1
	1.00	25	7.0	6.0	ESZ7F2 / GZ2D-7.0	ESZ7F2 / GZ3D-7.0

Dimensions

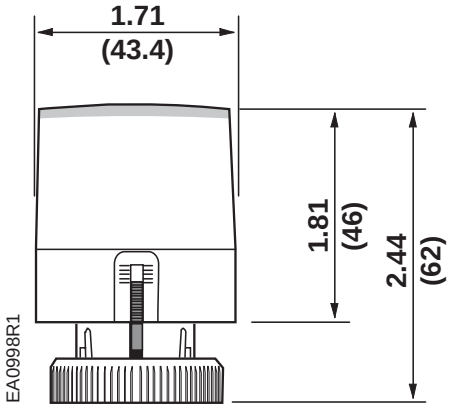


Figure 11. ESZ7 Thermic Actuator Dimensions Inches (mm).

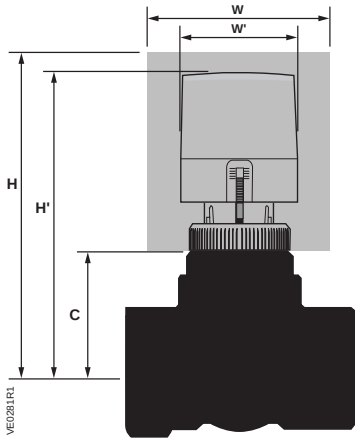


Figure 12. ESZ7F2 Thermic Actuator: 2-Way Valve Assembly Service Envelope.

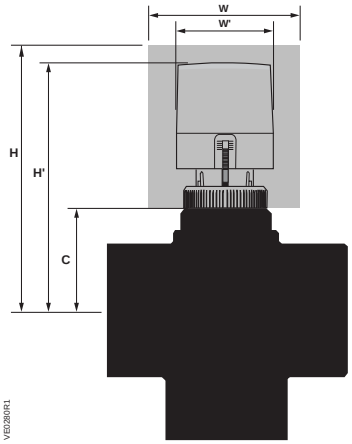


Figure 13. ESZ7F2 Thermic Actuator: 3-Way Valve Assembly Service Envelope.

Table 9. ESZ7F2 Thermic Actuator Dimensions and Recommended Service Envelope in Inches (Millimeters).

Valve Line Size	Valve Centerline to Top of Actuator H[1]		Service Height H		Valve Centerline to Actuator Coupling C		Width or Diameter of Actuator W[1]		Service Width W	
	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way	2-Way	3-Way
0.5 (15)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86 (47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)
0.75 (20)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86 (47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)
1.00 (25)	3.44 (87.4)	3.44 (87.4)	7.44 (189)	7.44 (189)	1.00 (25.4)	1.00 (25.4)	1.86 (47.3)	1.86 (47.3)	9.86 (251)	9.86 (251)

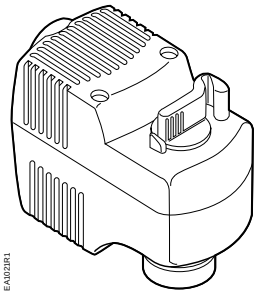
Dodge Engineering & Controls, Inc.

June 25, 2003

Basic Hot Water / Chilled Water Valve Actuator

ESZ4A1/A2 and ESZ5A1/A2 Electronic Valve Actuator 24 Vac or 120 Vac, 2-position Control

c UL us LISTED



Description

The ESZ4A1/A2 and ESZ5A1/A2 electronic valve actuators accepts either a 24 Vac or 120 Vac power supply signal to provide two-position control. This actuator works with Basic Hot Water/Chilled Water Zone Valves with 1/10-inch (2.5 mm) stroke.

Features

- UL listed for plenum installations
- Direct coupled installation without tools
- Manual override
- Visual position indication

Application

For use in heating and cooling HVAC applications with Basic Hot Water/Chilled Water Zone Valves that need 24 lb (105N) nominal force.

Product Number

Part Number	Two-Position Description	
ESZ5A1	120 Vac	Normally Closed
ESZ4A1	120 Vac	Normally Open
ESZ5A2	24 Vac	Normally Closed
ESZ4A2	24 Vac	Normally Open

Ordering Information

To order a complete valve plus actuator, combine the actuator part number with the suffix of the valve product number.

To order a single actuator, use the part number (for example, ESZ5A1).

Warning/Caution Notations

WARNING:		Personal injury/loss of life may occur if procedures are not performed as specified.
CAUTION:		Equipment damage may occur if the user does not follow procedures as specified.

Specifications

Power supply	Operating voltage	24 Vac ±20%	120 Vac ±20%
	Frequency	60 Hz	60 Hz
	Power consumption	9.8 VA	9.8 VA
Function	Running time	35 seconds	
	Nominal stroke	1/10-inch (2.5 mm)	
	Nominal force	24 lb (105N)	
Agency certification		UL listed to UL873 cUL certified to Canadian Standard C22.2 No. 24-93	
Ambient conditions	Operation		
	Temperature	41°F to 122°F (5°C to 50°C)	
	Humidity	0% to 90% rh (non-condensing)	
	Transport and storage		
	Temperature	-13°F to 158°F (-25°C to 70°C)	
	Humidity	0% to 90% rh (non-condensing)	
Miscellaneous	Mounting location	NEMA 1 (interior only)	
	Noise	<35 db	
	Medium temperature	34°F to 230°F (1°C to 110°C)	
	Dimensions- Inches (mm)	3.4 (85.2) H × 4.4 (111) W × 2.3 (58) D	
	Weight	1.18 lb (0.54 kg)	

Operation

A 24 Vac or 120 Vac control signal drives the actuator from its normal (0 voltage) position.

In the event of power loss, the actuator will return to its normal extended position for the ESZ5A1 and ESZ5A2 or normal retracted position for the ESZ4A1 and ESZ4A2.

Mounting and Installation

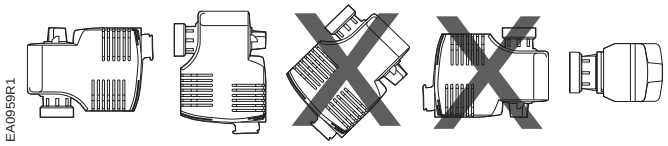


Figure 1. Mounting Position.

Mount the actuator in one of the allowable positions shown in Figure 1.

When mounting the actuator in a plenum, the proper cable must be attached to meet local codes.

Allow 8-inches (200 mm) above the actuator and 8-inches (200 mm) behind the cable for service.

Installation Instructions are included with the actuator.

Wiring

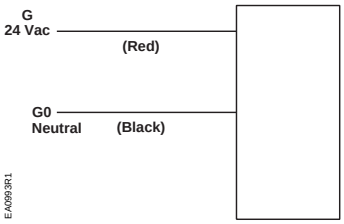


Figure 2. 24 Vac Wiring Diagram.

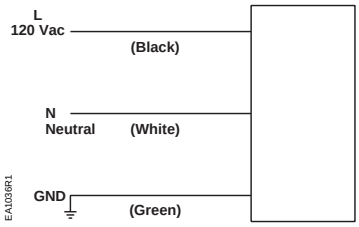


Figure 3. 120 Vac Wiring Diagram.

- Do not use autotransformers.
- Use earth-ground, isolating, step-down, Class 2, power supplies.
- Determine supply transformer rating by summing total VA of all actuators used.
- ESZ5A2/ESZ4A2 24 Vac actuators: Wiring connection is inside the actuator housing (remove housing top for access). The actuator lead length is 6-inches (152 mm).
- ESZ5A1/ESZ4A1 120 Vac actuators: Wiring connection requires junction box and flex conduit no further than 15-inches (381 mm) from the actuator. The actuator lead length is 18-inches (457 mm).

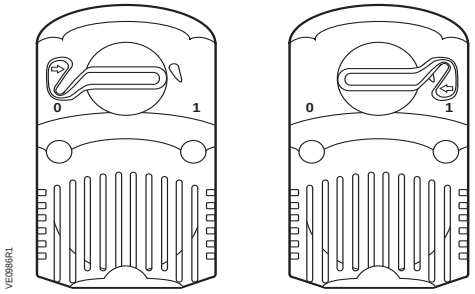
NOTE: One transformer should power no more than 10 actuators. (Transformers are not provided).

WARNING:
Wire connection, G is 24 Vac HOT or L is120 Vac HOT, not ground.

Manual Override

For manual positioning, simply turn the manual override handle to the protruding stop and squeeze the handle to latch and hold its position.

The actuator will maintain its position until power is provided.



NOTE:
The "0" and "1" position indicators are intended for reference only, and not for stroke measurement.

Figure 4. Manual Override Handle Positioning.

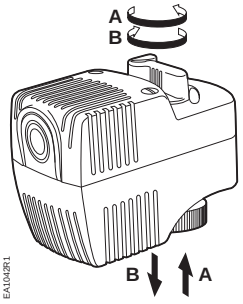
Start-Up

Check the wiring and the position indication.

When the position indicator is in the "0" position:

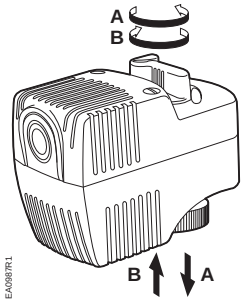
ESZ4: The output shaft will be retracted; the actuator is Normally Open. See Figure 5.
ESZ5: The output shaft will be extended; the actuator is Normally Closed. See Figure 6.

When the position indicator is in the "1" position, the reverse is true.



(A) Turn handle counterclockwise to retract spindle
(B) Turn handle clockwise to extend spindle.

Figure 5. Normally Open (ESZ4A1, ESZ4A2).



(A) Turn handle counterclockwise to extend spindle.
(B) Turn handle clockwise to retract spindle.

Figure 6. Normally Closed (ESZ5A1, ESZ5A2).

Troubleshooting

See *Wiring* for proper connections.

Service Kits

If the actuator is inoperative, replace the unit.

Dimensions

Inches (Millimeters)

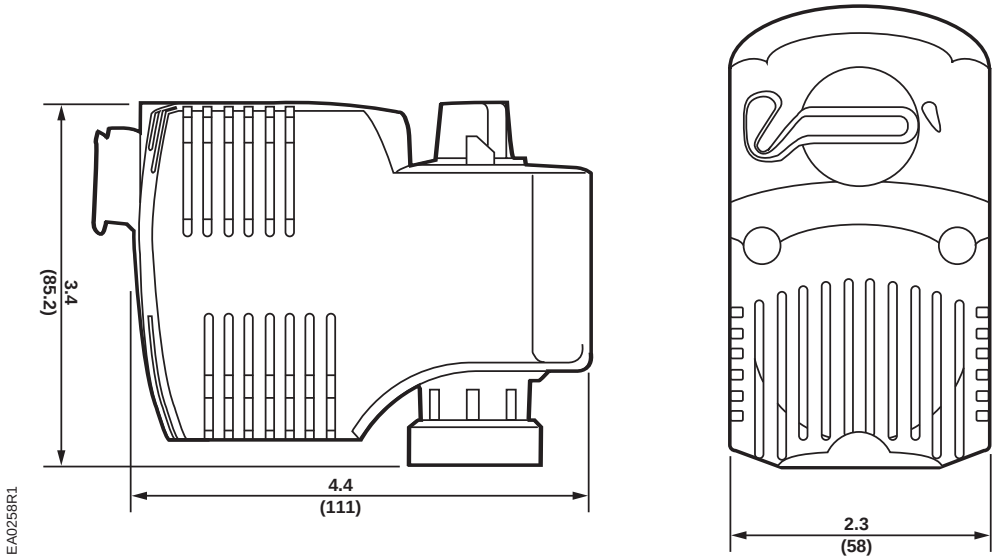


Figure 7. Dimensions of the ESZ4 & ESZ5 Series Actuator.

Service envelope

Minimum access space recommended:

8-inches (200 mm) above the actuator and beside the terminal plug.

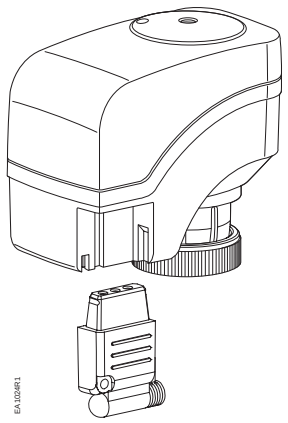
Dodge Engineering & Controls, Inc.

August 27, 2003

Basic Hot Water/Chilled Water Valve Actuator

ENZ4 Series 24 Vac Electronic Valve Actuator: 3-position or 0-10V Control Fail-in-Place

CE



Description	The ENZ4 Electronic Valve Actuator requires a 24 Vac power supply and receives a 0 to 10 Vdc signal or a three-position control signal to control a valve. This actuator is designed to work with Basic Hot Water/Chilled Water Zone Control Valves with a 1/10-inch (2.5 mm) stroke and a threaded valve bonnet that fits the actuator.
Features	• Direct-coupled installation without tools • Manual override with hex wrench • Visual position indication
Application	For use in heating and cooling HVAC water applications with the Basic Zone Valves (GZC/GZD) that need 22.5 lb (100N) nominal force.

Product Number

Part Number	Description		
ENZ4B2	24 Vac	0-10V	Fail-In-Place
ENZ4C2	24 Vac	3-Position	Fail-In-Place

Ordering Information

To order a complete valve plus actuator assembly from the factory, combine the actuator product number with the suffix of the valve product number.

To order a single actuator, use the product number (for example, ENZ4B2).

Warning/Caution Notations

WARNING		Personal injury/loss of life may occur if procedures are not performed as specified.
CAUTION		Equipment damage may occur if the user does not follow procedures as specified.

Specifications

		ENZ4B2	ENZ4C2
Power supply	Operating voltage	24 Vac ±20%	24 Vac ±20 %
	Frequency	50/60Hz	50/60 Hz
	Power consumption	0.8 VA	2.0VA
Function	Running time		
	ENZ4C2	150 seconds	
	ENZ4B2	34 seconds	
	Nominal stroke	1/10-inch (2.5 mm)	
	Nominal force	24 lb (105N)	
Agency certification	EMC directive	89/336/EEC	
CE Conformance	Low Voltage direction	73/23/EEC	
Ambient conditions	Ambient temperature		
	Operation	41°F to 122°F (5°C to 50°C)	
	Transport and storage	-13°F to 158°F (-25°C to 70°C)	
	Admissible temperature of medium in valve	32°F to 212°F (0°C to 100°C)	
Miscellaneous	Medium temperature	32 to 212°F (0 to 100°C	
	Dimensions Inches (mm)	3.4 H × 4.4 W × 2.3 D inches	
		(85.2 H × 111 W × 58 D mm)	
	Weight	9 oz (0.25 kg)	

Operation

The actuators can be driven manually to any position between 0 and 1 with a 3 mm Allen key. A control signal from the controller; however, will take priority over any manual position.

Mounting and Installation

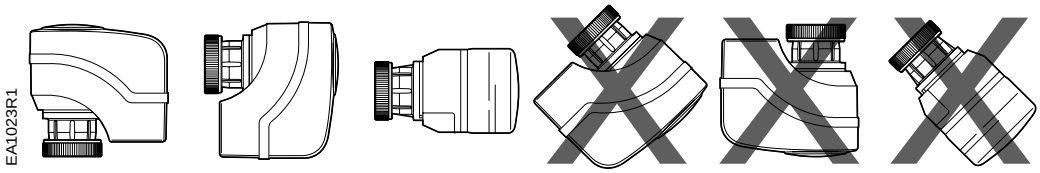


Figure 1. Mounting Position.

Mount the actuator in one of the allowable positions shown in Figure 1.

When mounting the actuator in a plenum, the proper cable must be attached to meet local codes.

Allow 8-inches (200 mm) above the actuator and 8-inches (200 mm) behind the cable for service.

Installation Instructions are included with the actuator.

Wiring

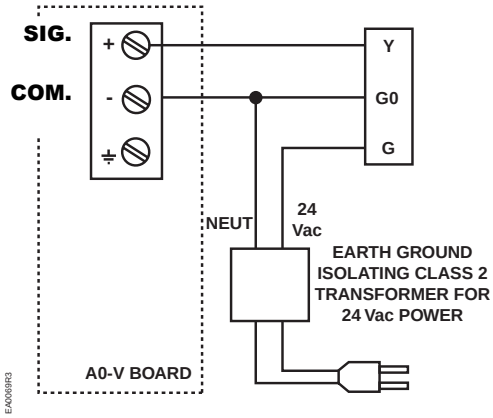


Figure 2. ENZ4B2 Wiring Diagram.

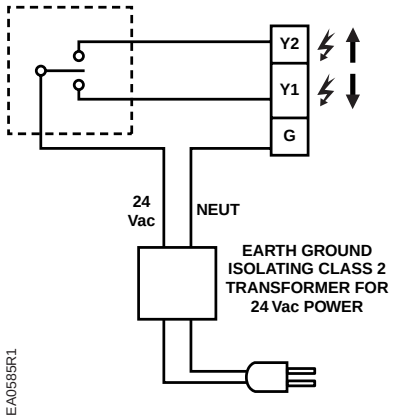


Figure 3. ENZ4C2 Wiring Diagram.

- Do not use autotransformers.
- Use earth-ground isolating, step-down, Class 2, power supplies.
- Determine supply transformer rating by summing total VA of all actuators used.
- Use one transformer to power up to 10 actuators. (Transformers are not provided.)

WARNINGS:

- Wire connection G is 24 Vac, not ground.
- G0 and G must be properly wired for correct function and full life of the actuator.

Commissioning

Check the wiring and the functioning of the actuator.

- Spindle retracted (movement from Mark 0 to Mark 1): Valve opens.
- Spindle extended (movement from Mark 1 to Mark 0): Valve closes.

CAUTION:
The ENZ4B2 calibrates itself (calibration stroke) during start-up. Correct functioning cannot be guaranteed if the actuator is operated without a valve.

Manual Override

The actuators can be driven manually to any position between "0" and "1" with a 3 mm hex key. The actuator will maintain its position until power is provided or restored. A control signal from the controller, however, will take priority over any manual position.

NOTE: Do not perform manual override while the power supply is connected: The actuator will not track properly when the control signal is applied. A short power-off/power-on sequence is recommended to recalibrate the actuator.

NOTE: To hold the actuator in the manually set position, the connecting cable must be unplugged.

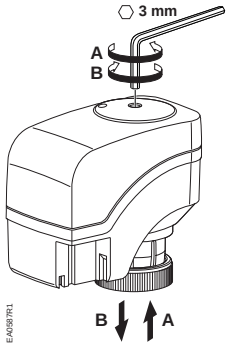
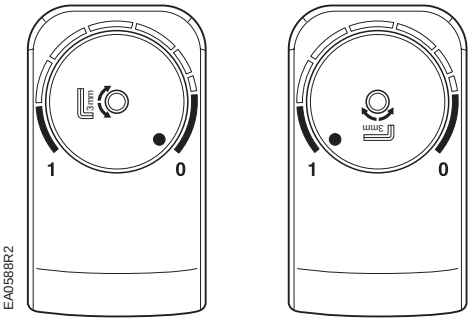


Figure 4.
Manual Adjustment with
3 mm hex key

- (A) Turn the hex wrench counterclockwise and spindle retracts.
- (B) Turn hex wrench clockwise and spindle extends



Position Indicator at 0

Position Indicator at 1

Figure 5. Position Indicator.

NOTE: The "0" and "1" position markings are intended for reference only and not for stroke measurement.

Troubleshooting

See *Wiring* for proper connections.

If the actuator does not provide full flow or full close off, check that the actuator is properly attached to the valve. If not, turn power off, tighten the bonnet ring on to the valve completely, and power up to recalibrate.

If the actuator becomes inoperative, replace it.

Dimensions

Inches (Millimeters)

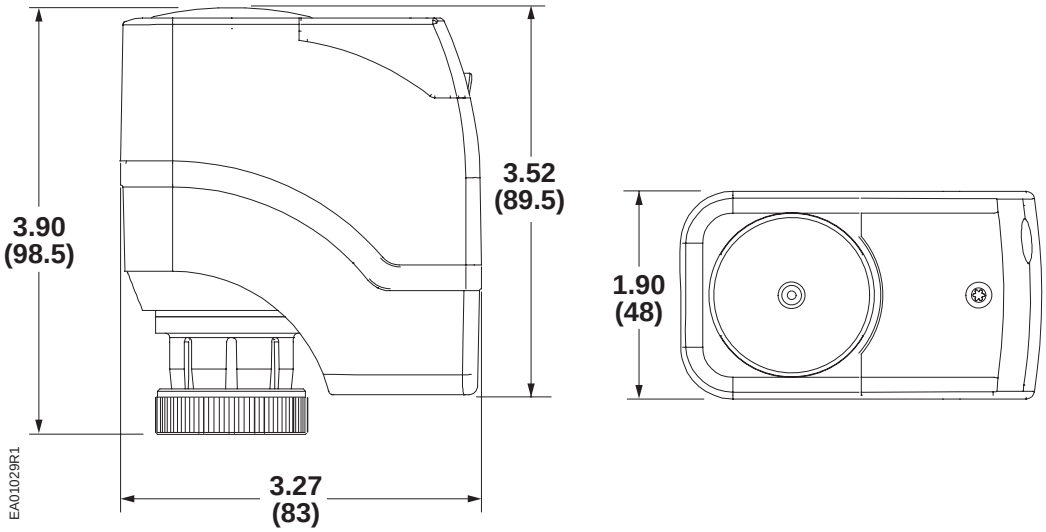


Figure 6. Dimensions of the ENZ4B2/C2 Series Actuator in Inches (mm).

Service envelope

Minimum access space recommended:

8-inches (200 mm) above the actuator and beside the terminal plug.

Dodge Engineering & Controls, Inc.

March 15, 2004

Basic Hot Water/Chilled Water Valve Actuator

ESZ7F2/ESZ6F2 Series

2-Way, 3-Way Zone Valve Thermic Actuators

CE

Description

24 Vac/Vdc Zone Valve actuator with a 1/10-inch (2.5 mm) stroke

Features

- Easy assembly via direct coupled universal attachment
- Movement and position indication
- Robust, no maintenance required
- Friction-free
- Two-wire connection
- Standard versions with 3.9-foot connecting cable
- PWM control
- AC/DC two-position control

Application

For use with Dodge Engineering & Controls 1/10-inch (2.5 mm) stroke Zone valves.

Product Numbers

Table 1.

Product Numbers	Voltage	Cable Length Feet (Meters)	Action
ESZ7F2	24 Vac/Vdc	3.9 (1.2)	Normally Closed
ESZ6F2			Normally Open

Warning/Caution Notations

WARNING:	⚠	Personal injury/loss of life may occur if a procedure is not performed as specified.
CAUTION:	⚠	Equipment damage may occur if a procedure is not performed as specified.

Ordering

The actuator and valve body can be ordered as separate items or as an assembly. State the quantity, product number, and description.

Example: 1 ESZ7F2 Thermic actuator with 3.9-foot (1.2 m) cable.

Specifications			
Power Supply	Supply voltage		24 Vac, 50 to 60 Hz or 24 Vdc Maximum voltage tolerance ±20%
	Power consumption		
			Normal operation 2.5W Power on 6 VA
	Switch-on current (transient)		250 mA
	Primary fuse		External
Control Signal	Supply voltage		On/off
Product Data	Stroke		1/10-inch (2.5 mm)
	Manual adjustment		None
	Position when de-energized		
		ESZ7F2	Actuator shaft extended, valve closed
		ESZ6F2	Actuator shaft retracted, valve open
	Nominal force		105N
	Maintenance		None required
	Dimensions (H × W)		2.44-inch × 1.71-inch (62 ×43.5 mm)
	Weight		0.33 lb (0.15 kg)
Materials	Cover and base		Polycarbonate
Electrical Connection	Connecting cable (fixed)		Stranded conductor 3.94 ft (1.2 m), 2 × 0.03-in^2 (0.75 mm^2)
Environmental Conditions	Conditions of use		Indoors
	Operation		
	Temperature		41°F to 122°F (5°C to 50°C)
	Humidity		5% to 85% rh
	Storage		
	Temperature		41°F to 122°F (5°C to 50°C)
	Humidity		5% to 95% rh
	Transport		
	Temperature		–4°F to 140°F (–20°C to 60°C)
	Humidity		5% to 95% rh
Mounting	Method		Hand-tightened firmly onto the valve
	Orientation		Upright to horizontal
Agency Approvals			Conforms to CE requirements

Mechanical Design

The ESZ7F2/ESZ6F2 solid expansion medium actuators have no rotating parts, and in the absence of friction, there is no noise and wear is kept to a minimum.

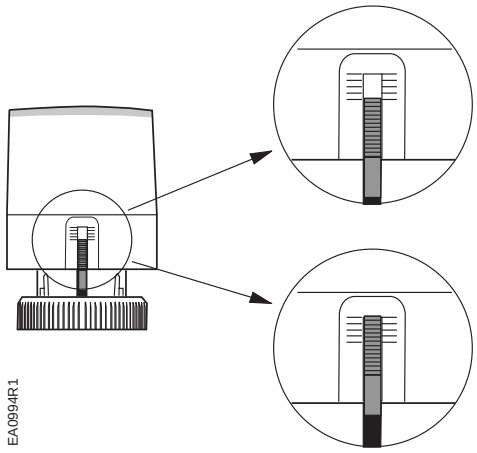
Direction of Operation

When a voltage is applied to the ESZ7F2/ESZ6F2 Thermic actuator, the resulting current in the heating element causes the solid expansion medium to expand. This expansion is converted into a linear movement, which causes the actuator shaft to move. When de-energized, the actuator shaft returns to its starting position.

Two-position Control

The actuator can be installed in any 24 Vac/Vdc control loop for two-position control.

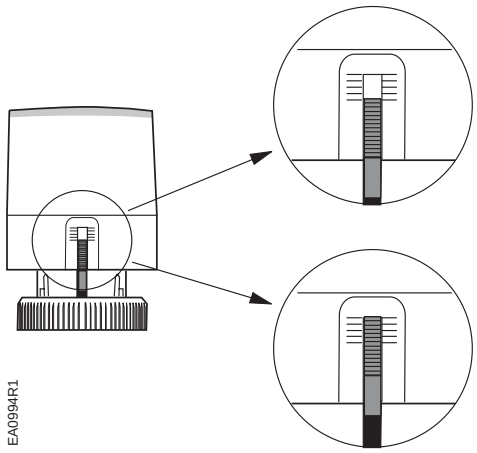
Position and Movement Indication



In this position the ESZ7F2 actuator shaft is extended and the valve is closed.

In this position the ESZ7F2 actuator shaft is retracted and the valve is open.

Figure 1. ESZ7F2 Position and Movement Indication.



In this position the ESZ6F2 actuator shaft is extended and the valve is closed.

In this position the ESZ6F2 actuator shaft is retracted and the valve is open.

Figure 2. ESZ6F2 Position and Movement Indication.

Opening and Closing Times

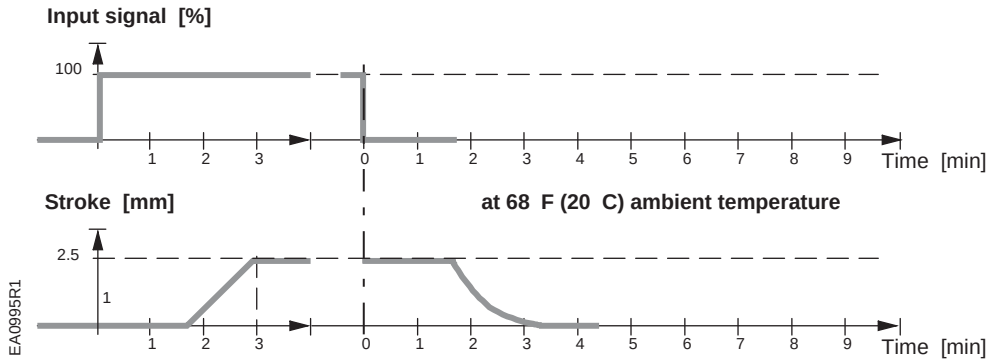


Figure 3. Opening and Closing Times.

NOTE: The running/delay time is affected by the ambient temperature and voltage.

Mounting and Installation Notes

Mounting instructions are printed on the plastic bag.

When the ESZ7F2/ESZ6F2 actuator is supplied separately from the valve, it can be easily assembled on-site:

- Position the actuator and tighten the knurled ring by hand.

CAUTION:
Do not use pipe wrenches, spanners, or similar tools to install actuator.

- The plastic bag can be used as a temporary protection for dust, etc.

WARNING:

The actuator must be installed only in a position from upright to horizontal (the range marked with arrows. See Figure 4). Do not mount the actuator below horizontal.

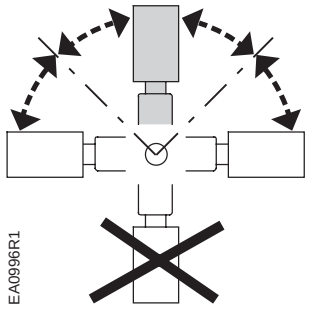


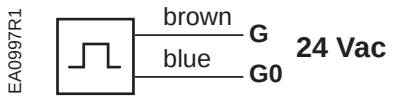
Figure 4. Acceptable Mounting Positions.

Electrical Installation

- Observe all local installation regulations.
- Install the connecting cable downwards so that it leads away from the actuator.
- Isolate the power supply. (For example, connect an automatic circuit breaker or switch fuse upstream of the control unit.)

Wiring Diagram

ESZ7F2/ESZ6F2



NOTE: G: positive
G0: neutral

Figure 5. Wiring Diagram.

Dimensions

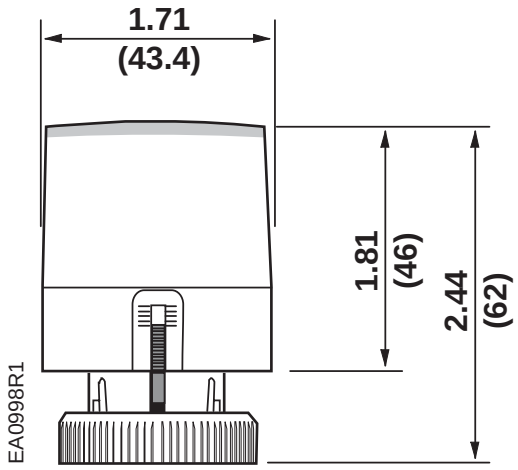


Figure 6. Dimensions in Inches (Millimeters).

Basic Hot Water/Chilled Water Actuators & Zone Valves Type A